CLAIMS:

1. A method of recording information in a recording medium capable of being set in a first state at a second power level and in a second state at a third power level higher than said second power level of an energy beam, said energy beam and said recording medium being moved relatively to each other while radiating said energy beam on said recording medium thereby to record information in said recording medium in the form of length and interval of mark portions in said second state, comprising the steps of:

irradiating said recording medium with an energy beam of a first power level lower than said second and third power levels before and/or after recording the information;

irradiating said recording medium with one or more energy beam pulses including at least a pulse of said third power level when forming a mark portion in said second state; and

irradiating said recording medium, before or after the first energy beam pulse of one or more pulses for forming said mark portion, with an energy beam pulse of a radiation energy larger in the case where said mark portion in said second state has a first length than in the case where said mark portion has a second length.

2. A method of recording information according to Claim 1, wherein in the case where a mark portion of the first length is formed, the energy beam radiated before

the first pulse of one or more energy beam pulses for forming said mark portion is at a power level between said third power level and said second power level.

3. A method of recording information according to Claim 1, wherein in the case where a mark portion of said first length is formed, the power level of the interval between the first pulse and the second pulse of two or more energy beam pulses for forming said mark portion is higher than the power level of the interval between the pulses including the second and subsequent pulses.

4. A method of recording information according to Claim 1, wherein a mark portion of the shortest length is recorded with a pulse of said third power level, and a mark portion at least longer than said shortest length is recorded with two or more pulses including at least one pulse of said third power level.

5. A method of recording information in a recording medium capable of being set in a first state at a second power level and in a second state at a third power level higher than said second power level of an energy beam, said energy beam and said recording medium being moved relatively to each other while radiating said energy beam on said recording medium thereby to record information in said recording medium in the form of length and interval of said mark portion in said second state, comprising the steps of:

irradiating said recording medium with an energy beam of a first power level lower than said second

and third power levels before and/or after recording the information;

irradiating said recording medium with one or more energy beam pulses including at least a pulse of third power level when forming said mark portion in said second state; and

irradiating said recording medium, in the case where a space portion following said mark portion in said second state has a first length, with an energy beam pulse of a smaller energy than in the case where said space portion has a second length and at a power level lower than said second power level, after the last pulse of one or more energy beam pulses for forming said mark portion.

6. A method of recording information according to Claim 5, wherein in the case where the length of the space portion following said mark portion in said second state is the first length, the interval of the energy beam pulse radiated after the last pulse of said one or more energy beam pulses for forming said mark portion is longer than in the case where the length of said space portion is the second length.

7. A method of recording information according to Claim 5, wherein in the case where the length of said space portion is said first length, the power level of the energy beam pulse radiated after the last pulse of said one or more energy beam pulses for forming the preceding mark portion is lower than in the case where

the length of said space portion is said second length.

8. A method of recording information according to Claim 5, wherein a mark portion of the shortest length is recorded with a pulse of said third power level, and a mark portion at least longer than said shortest length is recorded with two or more pulses including at least a pulse of said third power level.

9. A method of recording information in a recording medium capable of being set in a first state at a second power level and in a second state at a third power level higher than said second power level of an energy beam, said energy beam and said recording medium being moved relatively to each other while radiating said energy beam on said recording medium thereby to record information in said recording medium in the form of length and interval of a mark portion in said second state:

wherein the shortest one of mark portions in said second state is obtained by radiating one or more energy beam pulses of said third power level;

wherein the longest one of mark portions in said second state is obtained by radiating a plurality of energy beam pulses of said third power level; and

wherein the power level of the pulse reaching the third power level for recording the shortest mark portion is higher than the power level of the first pulse for recording the longest mark portion.

10. An apparatus for recording information in a

recording medium capable of being set in a first state at a second power level and in a second state at a third power level higher than said second power level of an energy beam, comprising energy beam radiation unit and moving unit for moving said energy beam and said recording medium relatively to each other, the information being recorded in said recording medium in the form of length and interval of mark portions in said second state;

said apparatus further comprising a record waveform generating circuit including first means for causing said energy beam radiation means to irradiate said recording medium with a beam of a first power level lower than said second and third power levels before and/or after recording information, second means for causing said energy beam radiation means to irradiate said recording medium with one or more energy beam pulses including at least one pulse of said third power level when forming a mark portion in said second state, and third means for increasing the radiation energy, befor or after the first pulse of one or more energy beam pulses for forming said mark portion, more in the case where said mark portion in said second state has a first length than in the case where said mark portion in said second state has a second length.

11. An apparatus for recording information according to Claim 10, wherein said record waveform generating circuit, when forming a mark portion of the

first length, generates a record waveform in which the power level of the energy beam radiated before the first pulse of one or more energy beam pulses for forming said mark portion is at a power level between the third power level and the second power level.

12. An apparatus for recording information according to Claim 10, wherein said record waveform generating circuit, when forming a mark portion of said first length, generates a record waveform in which the power level of the interval between the first pulse and the second pulse of one or more pulses for forming said mark portion is higher than the power level of the interval between the pulses including the second and subsequent pulses.

13. An apparatus for recording information according to Claim 10, wherein said record waveform generating circuit generates a record waveform in which a mark portion of the shortest length is recorded with a pulse of the third power level and a mark portion at least longer than said shortest length is recorded with two or more pulses including at least a pulse of said third power level.

14. An apparatus for recording information in a recording medium capable of being set in a first state at a second power level and in a second state at a third power level higher than said second power level of an energy beam, comprising energy beam radiation means and moving means for moving said energy beam and said

recording medium relatively to each other, the information being recorded in said recording medium in the form of length and interval of mark portions in said second state;

further comprising a waveform generating circuit including first means for causing said energy beam radiation means to irradiate said recording medium with a beam of a first power level lower than said second and third power levels before and/or after recording the information, second means for causing said energy beam radiation means to irradiate said recording medium with one or more energy beam pulses including at least one pulse of said third power level for forming a mark portion in said second state, and third means for causing said energy beam radiation means to irradiate said recording medium, in the case where the space portion following a mark portion in said second state has a first length, with an energy beam of an energy smaller than in the case where said space portion has a second length, at a power level lower than said second power level after the last pulse of one or more energy beam pulses for forming said mark portion.

15. An apparatus for recording information according to Claim 14, wherein in the case where the space portion following said mark portion in said second state has the first length, the duration of the energy beam pulse radiated after the last pulse of one or more energy beam pulses for forming said record mark is lengthened by

said third means more than in the case where said space portion has the second length.

16. An apparatus for recording information according to Claim 14, wherein said record waveform generating circuit generates a record waveform in which the power level of the energy beam pulse radiated after the last pulse of one or more energy beam pulses for forming the preceding mark portion is lower in the case where said space portion has the first length than in the case where said space portion has the second length.

17. An apparatus for recording information according to Claim 14, wherein said record waveform generating circuit generates a record waveform in which a mark portion of the shortest length is formed with a pulse of said third power level and a mark portion at least longer than said shortest length is formed with two or more pulses including at least a pulse of the third power level.

18. An apparatus for recording information in a recording medium capable of being set in a first state at a second power level and in a second state at a third power level higher than said second power level of an energy beam, comprising energy beam radiation means and moving means for moving said energy beam and said recording medium relatively to each other, the information being recorded in said recording medium in the form of length and interval of a mark portion in said second state;

said apparatus further comprising a waveform generating circuit for generating a record waveform in which said third power level for forming the shortest mark portion in said second state by radiating one or more energy beam pulses is set higher than the power level of the first pulse for forming the longest mark portion in said second state by radiating a plurality of energy beam pulses.

19. An apparatus for recording information in a recording medium capable of being set in a first state at a second power level of an energy beam and in a second state at a third power level higher than said second power level of the energy beam, the information being recorded in said recording medium in the form of length and interval of a mark portion in said second state, comprising:

a system controller;

means for moving said recording medium relative to said energy beam;

means for generating a record waveform in which said recording medium is irradiated with an energy beam of a first power level lower than said second and third power levels before and/or after recording the information, said recording medium is irradiated with one or more energy beam pulses including at least a pulse of the third power level for forming a mark portion, the power is lowered below said third power level between said pulses, the second power level is caused to be reached at

least once in the space portion between the mark portions, and the radiation energy is increased when forming a mark portion of a predetermined length as compared with when forming a mark portion of a different length before and/or after the first pulse of one or more energy beam pulses including at least a pulse for forming said mark portion;

laser driving means;

an optical head; and

reproduced signal amplifier means.

20. A method of recording information in the form of space and mark portions on a recording medium capable of assuming first and second physical states corresponding to space and mark portions of information, respectively, the recording medium being irradiated, to produc a length of a portion of the recording medium in the second physical state, with an energy beam being movable relative to the recording medium and being modulated to have power levels varying with time in a pulse waveform in accordance with a mark portion of information, wherein:

said pulse waveform includes an information pulse section having at least one pulse serving to form a second physical state recording medium portion and a mark edge adjusting pulse section continuous with said information pulse section, said mark edge adjusting pulse section being cooperative with said information pulse section to define the length of said second physical

state recording medium portion to be produced.

21. A method according to claim 20, wherein each of the pulses included in said information pulse section has a third power level higher than a second power level with which said information pulse section starts and each of pulse intervals between the third power level pulses has a fourth power level lower than the second power level and higher than a first power level at which the energy beam is kept for information reading.

22. A method according to claim 21, wherein said information pulse section has at least three pulses, and said mark edge adjusting pulse section has a leading edge adjusting pulse immediately following a first occurring one of said at least three pulses of said information pulse section and continuous with a second occurring one of said at least three pulses of said information pulse section, said leading edge adjusting pulse has a sixth power level higher than the fourth power level.

23. A method according to claim 21, wherein said mark edge adjusting pulse section has a leading edge adjusting pulse immediately preceding and continuous with said information pulse section.

24. A method according to claim 23, wherein said leading edge adjusting pulse has a fifth power level higher than said second level and lower than said third level.

25. A method according to claim 24, wherein the fifth power level of said leading edge adjusting pulse is

substantially in a range from 0.1% to 36.4% of a difference between the third power level and the second power level.

26. A method according to claim 23, wherein said mark edge adjusting pulse section further has a trailing edge adjusting pulse immediately following and continuous with said information pulse section.

27. A method according to claim 26, wherein said trailing edge adjusting pulse has a power level and a duration that define a minimum energy of the energy beam when a space portion following a mark portion has a second shortest length among lengths of space portions.

28. A method according to claim 26, wherein said trailing edge adjusting pulse has an eleventh power lev l lower than said second power level and ending with said second power level.

29. A method according to claim 21, wherein said mark edge adjusting pulse section includes a trailing edge adjusting pulse immediately following and continuous with said information pulse section.

30. A method according to claim 29, wherein said trailing edge adjusting pulse has a power level and a duration that define a minimum energy when a space portion following a mark portion has a second shortest length among lengths of space portions.

31. A method according to claim 21, wherein said information pulse section has at least three pulses, and said mark edge adjusting pulse section has a leading edge

adjusting pulse immediately preceding and continuous with a latest occurring one of said at least three pulses of said information pulse section, said leading edge adjusting pulse has a tenth level higher than a power level of intervals between the third power level pulses.

32. A method of recording information in the form of space and mark portions on a recording medium capabl of assuming first and second physical states corresponding to space and mark portions of information, respectively, the recording medium being irradiated, to produce a length of a portion of the recording medium in the second physical state, with an energy beam being movable relative to the recording medium and being modulated to have power levels varying with time in a pulse waveform in accordance with a mark portion of information, wherein:

said pulse waveform includes an information pulse section having at least two pulses serving to form a second physical state recording medium portion, a latest occurring one of said at least two pulses of said information pulse section has a ninth power level lower than those of the other pulses of said at least two pulses of said information pulse section.

33. A method according to claim 32, wherein said information pulse section has at least three pulses, and the pulses between first and latest occurring ones of said at least three pulses of said information pulse section has a seventh power level higher than those of

said first and latest occurring pulses of said information pulse s ction.